Birds of Lake Naivasha 1. General studies

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Britton (1978) has described the birds of papyrus *Cyperus papyrus* swamp at Lake Kanyaboli on the northern shore of Kavirondo Gulf at Lake Victoria. There is little other information on birds of papyrus swamp in the Rift Valley of Kenya where those species found only in western papyrus swamps are absent (Greater Swamp Warbler *Acrocephalus rufescens*, White-winged Warbler *Bradypterus carpalis* and the papyrus endemic, Carruthers' Cisticola *Cisticola carruthersi* and other papyrus endemics such as the Yellow Swamp Warbler *Chloropeta gracilirostris* and Papyrus Canary *Serinus koliensis*).

There are extensive stands of papyrus at Lake Naivasha, although these vary in size from year to year depending on water levels and man's activities. For such an important bird site, and one visited by hundreds of ornithologists each year, the swamp communities of the lake are surprisingly poorly known.

A brief study, based on mist-netting, was made in early 1990 to investigate the composition of the swamp and swamp edge communities at Naivasha. It would be useful if this study could be extended to cover changes throughout the year, and between years. Preliminary data collected during the study on the ecological segregation of resident and migrant warblers in the swamp are presented in a companion paper (Tyler 1991).

Study area and methods

Lake Naivasha has been well described elsewhere, e. g. Njuguna (1981, 1982), Hartley (1985). The freshwater lake which is the highest of Kenya's Rift Valley lakes, lies at a altitude of 1884 m and covers an area of 120–130 km^2. The main body of the lake has a mean depth of only 5 m. Papyrus does not form a continuous band around the 50-km lake shore. In some places it has been cleared; in others it forms a narrow fringe, whilst at sites such as Safarilands, it may form a band over 100 m wide. The most extensive area is in the delta of three rivers flowing into the northern end of the lake. Here papyrus covers 11–12 km^2 (S. Njuguna, pers. comm.). There is therefore a large area of swamp and swamp edge habitats available to birds at Lake Naivasha.

In January, February and early March 1990 mist-netting was carried out at two sites on the western shore of the lake.

An evening and morning on 12–13 January (total 7 h) were spent at Fisherman's Camp with just two nets (120 feet—*c.* 37 m) at the edge of the papyrus and on a bank extending into it. A second evening and morning (total 7 h) on 13–14 January were spent at Safarilands. All subsequent visits were to this last site, and consisted of three weekends: 2–4 February; 16–18 February and an extended visit from 3–5 March—from 17:00 on the first evening to 11:00–12:00 on the last morning. In the evenings, netting continued until an hour after dusk; nets were then unfurled at or just before dawn. A maximum of 330 feet (100 m) of net was erected in a line extending from flooded grassland and swamp edge eastwards out into the papyrus swamp to within 10 m of the open water of the lake. The nets, which were set so that the bottom shelf was on or within 20 cm of the ground, were placed on a bank formed from material excavated from an irrigation channel.

The dry bank on which the nets were set varied from 0.5–3 m in width and from 0.5–2 m above the level of the lake. Clumps of *Sesbania sesban* grew on the grass-covered bank, with *Cassia* sp. and *Nicotiana glauca* on the landward side. To the north of the

bank lay a deep *c.* 5 m-wide drainage channel, carpeted with the introduced water fern *Salvinia molesta*, with a few clumps of Blue Water Lily *Nymphaea caerulea* and the recent invader Water Hyacinth *Eichhornia*. A narrow, shallower area of water lay between the channel and bank, in which grew some papyrus and other smaller *Cyperus* species, notably *C. immersus* and *C. digitatus*, and emergent plants such as Water Bistort *Polygonum* sp., Great Hairy Willow Herb *Epilobium hirsutum*, *Ludwigia* sp. and a yellow composite *Crassocephalum paludum*. Beyond the drainage channel was an extensive area of almost uniform papyrus stretching for over 0.5 km to the north and from 100–300 m in width. An occasional clump of reed-mace *Typha* occurred within the swamp. To the south of the drainage channel was a further extensive stretch of papyrus, *c.* 100 m in width, which merged into a band of *Sesbania* trees and flooded grassland with more scattered *Sesbania* trees on the landward side. On the first and last visit two additional nets were erected in the flooded grassland.

All species of birds seen or heard were noted, as was any breeding activity. All birds caught, other than a small sample of doves, weavers, queleas and waxbills, were ringed. Primary moult and wing-length (maximum flattened chord) were recorded; birds under 50 g were weighed to the nearest 0.1 g, and others to the nearest 1 g.

Results

Bird communities at Naivasha

Over 80 species were recorded at the two sites. At Safarilands some 55 species were recorded on all visits. This figure excludes birds such as doves that were not associated with the swamp or swamp edge, and also excludes open water species of the lake such as terns, pelicans, and various ducks such as White-backed Duck *Thalassornis leuconotus*. (Appendix 1).

A total of 1167 birds was ringed (Table 1). In the evenings large numbers of Red-billed Queleas *Quelea quelea*, weavers (mainly Black-headed *Ploceus cucullatus*, Speke's *P. spekei* and Masked *P. intermedius*, with a few Baglafecht *P. baglafecht*, Spectacled *P. ocularis* and Chestnut *P. rubiginosus*), Waxbills *Estrilda astrild*, occasional Crimson-rumped Waxbills *E. rhodopyga* and on one evening, Zebra Waxbills *Amandava subflava* were caught when flighting across the bank to roost in the swamp. Smaller numbers were also caught during the day, but most were released unringed. Few biometric data were obtained for these species. At dusk, hirundines, chiefly African Sand Martins *Riparia paludicola*, with a few Eurasian Swallows *Hirundo rustica*, Sand Martins *R. riparia* and Banded Martins *R. cincta* amongst them, flew from north to south across the net line at Safarilands to roost. On one evening a catch was made of Yellow Wagtails *Motacilla flava* coming in to roost in papyrus only 100–200 m north of the drainage channel. An estimated 4500+ wagtails were using the roost, flying in from all directions.

Warblers (Sylviinae) dominated the daytime catches. The Lesser Swamp warbler *A. gracilirostris* was the most frequently caught species (Table 1). Sedge *A. schoenobaenus* and Great Reed Warblers *A. arundinaceus* were the most numerous Palaearctic species (Table 1).

In early March an apparent movement of Lesser Swamp Warblers was occurring, with 140 new birds caught on that visit. Palaearctic migrants were also on passage in early March as shown by 43 new Sedge Warblers, and the first Willow Warblers *Phylloscopus trochilus*, a Wheatear *Oenanthe oenanthe* and Blackcap *Sylvia atricapilla*.

Many of the other species caught, such as Variable Sunbirds *Nectarinia venusta* and White-fronted Bee-Eaters *Merops bullockoides* were attracted by the flowering *Sesbania*

Table 1. *Totals of birds caught and ringed at Lake Naivasha between 12 January and 5 March 1990. Figures in parentheses are retraps from previous visits; * refers to individual birds that were caught but not ringed; a number followed by * indicates that one or more birds was ringed of an unspecified number caught.*

Species	12–13 Jan	13–14 Jan	2–5 Feb	16–18 Feb	2–5 Mar	Total
Little Bittern	-	2	1	2	2(1)	7
Squacco Heron	-	-	-	-	2	2
Little Egret	-	-	-	-	1	1
Hottentot Teal	-	-	-	1	4	5
Blacksmith Plover	-	-	-	-	1	1
Common Sandpiper	-	-	-	-	1	1
Wood Sandpiper	-	1	-	-	3	4
Ruff	-	-	-	1	-	1
Black Crake	-	-	-	1	2	3
African Water Rail	-	-	-	-	1	1
White-fronted Bee-eater	-	1	1	-	-	2
Didric Cuckoo	-	-	-	-	1	1
Pied Kingfisher	-	1	-	1	4(1)	6
Malachite Kingfisher	*	-	3	4(2)	2(2)	9*
Eurasian Swallow	-	4	3	2	1	10
Sand Martin	-	1	2	-	-	3
African Sand Martin	1	116*	177	107(4)	169(13)	570
Banded Martin	-	2	1	1	16	20
African Pied Wagtail	-	-	1	-	-	1
Yellow Wagtail	-	-	75	-	1	76
Black-headed Oriole	-	-	-	1	-	1
Stonechat	-	-	1	2	-	3
Northern Wheatear	-	-	-	-	1	1
Great Reed Warbler	1	1	6	10(2)	2(3)	20
African Reed Warbler	2	-	1	5	-	8
Lesser Swamp Warbler	5	5	49	35(7)	140(11)	234
Basra Reed Warbler	-	-	-	1	-	1
Sedge Warbler	-	12	11	8	43	74
Reed Warbler	1	2	-	1	3(1)	7
Little Rush Warbler	-	-	7	4	7(2)	18
Winding Cisticola	-	4	6	12(6)	8(4)	30
Hunter's Cisticola	-	2	-	-(1)	-	2
Grey-capped Warbler	1	-	-	-	-	1
Willow Warbler	-	-	-	-	4	4
Garden Warbler	1	1	-	-	-	2
Blackcap	-	-	-	-	1	1
Scarlet-chested Sunbird	1	-	-	-	-	1
Variable Sunbird	-	4	1	6	2(1)	13
White-winged Widowbird	-	-	-	4*	-	4*
Red-billed Quelea	-	1*	*	*	1*	2*
Baglafecht Weaver	-	-	-	*	-	*
Masked Weaver	-	*	*	*	-	*
Speke's Weaver	-	*	*	*	*	*

Continued overleaf

Species	12–13 Jan	13–14 Jan	2–5 Feb	16–18 Feb	2–5 Mar	Total
Black-headed Weaver	-	-	*	*	*	*
Spectacled Weaver	2	1	-	2(1)	5	10
Chestnut Weaver	-	-	-	-	1	1
Zebra Waxbill	-	1*	*	-	-	1*
Waxbill	-	1*	*	*	17(1)	18*
Crimson-rumped Waxbill	*	-	-	-	3	3*

Table 2. *Summary of wing moult in a sample of warblers caught in lakeside swamp at Lake Naivasha in early 1990. Figures given are numbers of birds showing wing moult (primary or secondary moult), and with fresh or worn flight feathers.*

	12–14 Jan wing			2–4 Feb wing			17–19 Feb wing			2–5 Mar wing		
	m	f	w	m	f	w	m	f	w	m	f	w
A. gracilirostris	-	10	-	3	27	1	7	25	7	16	127	8
A. schoenobaenus	-	12	-	-	9	1	2	6	-	3*	41	-
A. scirpaceus	-	3	-	-	-	-	1	-	-	-	2	-
A. griseldis	-	-	-	-	-	-	-	1	-	-	-	-
A. arundinaceus	-	2	-	-	6	-	-	11	1	-	4	-
A. baeticatus	-	2	-	-	1	-	-	5	-	-	-	-
B. baboecala	-	-	-	1	6	-	3	1	-	-	8	-
C. galactotes	1	3	-	-	8	-	3	13	1	-	9	-
P. trochilus	-	-	-	-	-	-	-	-	-	1	4	-

Key: m = moult, f = fresh, w = worn; *A.* = *Acrocephalus*, *B.* = *Bradypterus*, *C.* = Cisticola, *P.* = *Phylloscopus*; * two *A. schoenobaenus* in early March showed arrested moult.

and *Nicotiana* or insects attracted to these trees and shrubs. Small numbers of kingfishers, and occasional waders and ducks, were caught when flighting across the bank along the lake edge or in the flooded grassland (Table 1). Few Black Crakes *Limnocorax flavirostris* and African Water Rails *Rallus caerulescens* were ringed, but many others were temporarily caught but then escaped, or avoided capture by creeping under the nets.

Breeding activity

None of the passerines had obvious brood patches, and no recently fledged young were caught. However, some *A. gracilirostris* had what was assumed to be juvenile plumage; this was recognizable by the more buff-rufous colour of the head and mantle compared with the darker brown of adults, and by the pale yellow colour of the inner mandibles compared to the reddish-orange colour of the adults' gape. Black tongue spots were clearly visible in these juveniles. Traces of the tongue spots could also be seen on other birds with more normal adult plumage. These were thought to be immature birds. The

weavers, queleas and widow birds were all either in, or coming into, full breeding dress.

In early March Winding Cisticolas *Cisticola galactotes* had established territories and there was much courtship behaviour. Little Rush Warblers *Bradypterus baboecala* were then also singing and displaying.

Only Black Crakes were proved to be breeding, with an adult with two small young (less than one week old). One of the Little Bitterns *Ixobrychus minutus* caught in January had an apparent brood patch.

Moult

A small proportion (up to 11 per cent) of *A. gracilirostris* were in active moult, but most had fresh or only slightly worn flight feathers, with a few with very worn feathers (Table 2). A greater proportion were moulting on later visits. Some *B. baboecala* were in moult in February but all eight birds caught in March had fresh plumage. Likewise a small proportion of *C. galactotes* were in moult in February but all nine birds handled in March had very fresh flight feathers (Table 2).

Of the Palaearctic visitors, most *A. schoenobaenus* had fresh plumage. The only bird in moult in early February had old worn plumage with the tail feathers all just regrowing, whilst two moulting later that month were in primary moult. Two of three moulting birds caught in March showed arrested moult. All *A. arundinaceus* on all visits had fresh plumage except for one still in secondary moult in mid February. Only small numbers of *A. scirpaceus* were caught, but one in February was in active moult (Table 2).

Discussion

The bird community

The true swamp birds comprised crakes, rails, coots and gallinules, and warblers. Waxbills and weavers also used this habitat sometimes during the day but most arrived at dusk to roost in the papyrus in large numbers. Hirundines and Yellow Wagtails also used the swamp as a roost but fed over the lake and on grassland during the day. Other species caught were not dependent on the papyrus swamp but on open water or flowering trees.

Of the non-granivorous passerines (excluding hirundines) caught in this study in the Lake Naivasha swamp and swamp edge, some 38 per cent were migrants. In general, both resident and migrant passerines were very much more numerous in the Naivasha papyrus swamp than in swamp at Lake Victoria in western Kenya (Britton 1978), where only 300 birds, including 186 granivorous birds, were caught in monthly 4-h early morning netting sessions during 15 months. This may indicate that papyrus at Naivasha is more productive than that at Lake Victoria, but the high numbers at the former site may be due to the much narrower fringe of swamp here with a greater diversity of habitats (e.g. ditch, bank and *Sesbania* trees) and the edge effect of swamp/flooded grassland

The Lesser Swamp Warbler was the most abundant warbler at Naivasha within the papyrus bed, whereas in western Kenya, where the larger Greater Swamp Warbler was most numerous, the smaller species was scarce and restricted to swamp edges and rocky islands. Of note was the marked increase in the number of Lesser Swamp Warblers on the last visit to Naivasha: 140 new individuals of this species were ringed in *c.* 34 h of netting activity from 2–5 March, compared with 84 birds in *c.* 42 h of the previous two week-ends. The small number of retraps (Table 1) also indicates that these birds were dispersing through the papyrus rather than holding territory. The majority of Lesser Swamp Warblers was also caught in the same small area of papyrus towards the edge of the lake, suggesting that they were moving along the lake edge but within the swamp.

In Uganda and at a number of sites in Kenya, Pearson (1972) and Pearson *et al.* (1979) have shown the main arrival of Sedge Warblers to be in January and February, with numbers increasing during the spring to reach a peak in April–May. Unfortunately netting ceased at Naivasha in early March, but on the last visit numbers of Sedge Warblers had greatly increased (Table 1). A passage of other migrants was evident in early March with Willow Warblers, Wheatear and Blackcap being caught.

From the limited retrap data, several Great Reed Warblers appeared to be holding territory within the swamp.

Breeding Seasons

In terrestrial habitats in East Africa, many insectivorous birds breed at the onset of rains, and during rains, when there are peaks in insect numbers (Sinclair 1978, Dingle & Khamala 1972). In western Kenya the timing of breeding of the papyrus swamp birds also coincided with the long rains, although some birds were reared in the short rains of October to November (Britton 1978). Brown & Britton (1980) recorded many wetland birds showing a peak in breeding activity in or after the main rains from March to May, with some species having a second peak in the autumn short rains (October–November). Unfortunately, data are limited for the swamp warblers other than for Winding Cisticolas and Lesser Swamp Warblers which show a peak from April to July. Only one nest of African Reed Warbler is noted by Brown & Britton (1980), and just three nests of Little Rush Warblers. Jackson (1938) described a Little Rush Warbler nest at Naivasha low down within a few inches of the ground in a large tuft of reeds; he found many Lesser Swamp Warbler nests at higher levels, slung between two or more stems in reeds or in papyrus some 2–4 feet (0.6–1.3 m) above the water.

At Naivasha the rainfall increases markedly in late February/March to a peak in April, then drops off by June (Brown & Britton 1980). Although no nests were found in this study, several species, notably Winding Cisticolas, were singing vigorously and showing courtship behaviour by early March. The marked passage of Lesser Swamp Warblers probably indicated pre-breeding dispersion.

There are few data available on the seasonal abundance or composition of invertebrates in the papyrus swamp or at the lake edge at Naivasha. Britton (1978) suggested that there was a flush of insects in papyrus swamp in western Kenya associated with the onset of rains, whilst at Entebbe (Uganda), on Lake Victoria, Okia (1976) has demonstrated a seasonal increase in numbers of the mosquito *Aedes africanus*, which reaches a peak in the wet months of April and May.

Moult

The pattern of moult shown by the Lesser Swamp Warblers caught at Naivasha was consistent with the general pattern described by Britton (1978). He found that resident birds have a postnuptial moult, which lasts for about six months usually from June to November. Moult of immatures begins and ends some two months later than in adults, whilst birds reared in the autumn short rains still have primary moult only half completed at the start of the long rains. Thus the majority of Naivasha Lesser Swamp Warblers and other resident warblers in February and early March had fresh or only slightly worn plumage. Those Lesser Swamp Warblers in primary or secondary moult may have bred in the autumn rains, as confirmed by the presence of juveniles in the population.

The moult patterns of Sedge and Great Reed Warblers at Naivasha were also similar to those described by (Pearson 1973, 1975). Birds that winter furthest south, e.g. Marsh

Warbler *Acrocephalus palustris*, moult latest in the winter, but those that winter around the equator such as Reed Warblers, moult earlier, mainly in late autumn. Sedge and Great Reed also moult early during their stay in Africa, but south-east populations renew their plumage before the spring migration. Thus most Sedge Warblers that arrive late in East Africa are freshly moulted, having moulted elsewhere in late autumn. A few earlier arrivals are a mix of freshly moulted, unmoulted and just started. Likewise, Great Reed Warblers spending the late winter in Kenya, undergo moult in the late autumn north of the equator.

Acknowledgements

Thanks are due to Graeme Backhurst and Anna Forbes-Watson, and to David Pearson and Daphne Backhurst for their help in extracting and ringing birds on two days. We are particularly grateful to Professor S. Njuguna of the Herbarium at the National Museum, Nairobi for his help and advice.

References

Britton, P. L. 1978. Seasonality, density and diversity of birds of a papyrus swamp in Western Kenya. *Ibis* 120: 450–466.

Dingle, H. & Khamala, C. P. M. 1972. Seasonal changes in insect abundance and biomass in an East African grassland with reference to breeding and migration in birds. *Ardea* 59: 216–221.

Hartley, J. 1985. A *Guide to the Naivasha area.* Nairobi: Evans Brothers (Kenya) Ltd.

Njuguna, S. 1981. Naivasha Lakes. *Swara* 4(3): 8–12.

Njuguna, S. 1982. Papyrus. *Swara* 5(6): 24–27.

Okia, N. O. 1976. Birds of the understorey of lake-shore forests on the Entebbe Peninsula,Uganda. *Ibis* 118: 1–13.

Pearson, D. 1972. The wintering and migration of Palaearctic passerines at Kampala, southern Uganda. *Ibis* 114: 43–60.

Pearson, D. 1973. Moult of some Palaearctic migrants wintering in Uganda. *Bird Study* 20: 24–36.

Pearson, D. J. 1975. The timing of complete moult in the Great Reed Warbler *Acrocephalus arundinaceus*. *Ibis* 117: 506–509

Pearson, D. J., Backhurst, G. C. & Backhurst, D. E. G. 1979. Spring weights and passage of Sedge Warblers *Acrocephalus schoenobaenus* in central Kenya. *Ibis* 121: 8–19

Sinclair, A. R. E. 1978. Factors affecting the food supply and breeding season of resident birds and movements of Palaearctic migrants in a tropical African savannah. *Ibis* 120: 480–497.

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 Received 12 November 1990

Appendix 1

Birds seen in or at the edge of the swamp but not, or only rarely, caught.

Little Grebe *Tachybatus ruficollis*—frequent in flooded grassland and on lake.

Long-tailed Cormorant *Phalacrocorax africanus*—frequent in flooded grass.

Dwarf Bittern *Ixobrychus sturmii*—one seen at swamp edge on 16–17 Feb and in early March.

Little Bittern *I. minutus payesii*—caught but not otherwise seen at Safarilands site; one *minutus* caught there and one seen at Fishermans Camp. (Wing-length 142–147 mm, n = 5, mean 144.5 (*payesii*); 141–144 mm, n = 2, mean 142.5 (*minutus*); mass 111.5–135 g, mean 124.3 (*payesii*); 94–128 g (*minutus*). One bird disgorged a partly digested rodent, and another a Louisiana Red Swamp crayfish.)

Grey Heron *Ardea cinerea*—regular at swamp edge.

Purple Heron *Ardea purpurea*—frequent at swamp edge.

Squacco Heron *A. ralloides*—frequent at swamp edge. (Wing-length 207, 222 mm, n = 2; mass 201, 236 g.)

Cattle Egret *Bubulcus ibis*—frequent at swamp edge and on adjacent grassland.

Little Egret *Egretta garzetta*—frequent at swamp edge.

Hadada *Bostrychia hagedash*—frequent at swamp edge and adjacent grassland.

Glossy Ibis *Plegadis falcinellus*—two seen at swamp edge at Fishermans Camp; small groups flying by swamp at Safarilands.

Sacred Ibis *Threskiornis aethiopica*—frequent at swamp edge.

African Spoonbill *Platalea alba*—small numbers at swamp edge.

Egyptian Goose *Alopochen aegyptiacus*—several at swamp edge.

Pintail *Anas acuta*

Shoveler *A. clypeata*

Garganey *A. querquedula*—all three Palaearctic species noted in flooded grassland; Garganey most numerous—20+.

Red-billed Teal *A. erythrorynchos*—small numbers in flooded grassland.

Hottentot Teal *A. hottentota*—frequent in flooded grassland. (Wing-length 151–160 mm, n = 5, mean 154; mass 227–266 g, n = 4, mean 245 g.)

Yellow-billed Duck *A. undulata*—commonest resident duck in flooded grassland.

Eurasian Marsh Harrier *Circus aeruginosus*—frequent over swamp.

African Marsh Harrier *C. ranivorus*—regularly seen over swamp.

Fish Eagle *Haliaeetus vocifer*—common over lake, swamp, and edge habitats.

Black-shouldered Kite *Elanus caeruleus*—one regularly hunting at swamp edge.

Osprey *Pandion haliaetus*—occasional.

Crowned Crane *Balearica pavonina*—a pair at swamp edge.

Moorhen *Gallinula chloropus*—frequent in and at edge of swamp.

Black Crake *Limnocorax flavirostra*—common in and at edge of swamp; many crossed the bank, walking below the nets. Adult with small young and juveniles seen.

African Water Rail *Rallus caerulescens*—heard or seen on every visit to Safarilands, in and at the edge of the swamp, often walking on *Salvinia* in the irrigation channel.

Red-knobbed Coot *Fulica cristata*—common in swamp.

Purple Gallinule *Porphyrio porphyrio*—occasionally seen, but often heard in swamp.

Jacana *Actophilornis africanus*—only infrequently seen at Safarilands in the drainage channel; common at Fishermans Camp.

Blacksmith Plover *Vanellus armatus*—frequent at swamp edge and adjacent grassland in pairs.

Long-toed Lapwing *V. crassirostris*—one pair in swamp at Safarilands; pair also at swamp edge at Fishermans Camp.

(Waders feeding on the flooded grassland at swamp edge were mainly Wood Sandpipers *Tringa glareola* and Ruff *Philomachus pugnax*, with smaller numbers of other species, notably Marsh sandpipers *T. stagnatilis*, Greenshank *T. nebularia* and Common Snipe *Gallinago gallinago*.)

Giant Kingfisher *Ceryle maxima*—female seen on four visits to Safarilands feeding in flooded grassland at swamp edge; constantly harried by Pied Kingfishers.

Pied Kingfisher *C. rudis*—common at swamp edge. (Wing-length 139–143 mm, n = 5, mean 141 mm; mass 71.1–81 g, n = 5, mean 78.4 g.)

Chestnut-bellied Kingfisher *Halcyon leucocephala*—one to two birds at swamp edge or amongst trees on adjacent grassland.

Malachite Kingfisher *Alcedo cristata*—the commonest kingfisher at both sites; adults plus immatures caught. (Wing-length 56–60 mm, n = 11, mean 57.8 mm; mass 14.5–16.8 g, n = 11, mean 15.8 g.)

White-throated Bee-eater *Merops bullockoides*—frequent at edge of swamp in ones and twos.

Banded Martin *Riparia cincta*—small numbers caught with other hirundines; (Wing-length 120–135 mm, n = 16, mean 128.3 mm; mass 19.5–24 g, n = 16, mean 21.5 g.)

African Sand Martin *Riparia paludicola*—the most numerous hirundine. Retraps suggested the total size of the flock roosting in the papyrus at the ringing site was less than 2000 birds. (For moult see Appendix 2.)

Stonechat *Saxicola torquata*—several birds at swamp edge.

Northern Wheatear *Oenanthe oenanthe*—recorded only in early March.

Willow Warbler *Phylloscopus trochilus*—several birds seen and heard at both sites on each visit, but only caught and heard singing in early March.

Grey-capped Warbler *Eminia lepida*—only seen (and one caught) at Fishermans Camp (frequent in scrub at swamp edge further north at Elsamere).

Cape Wagtail *Motacilla capensis*—pair at swamp edge feeding with Yellow Wagtails *M. flava* at Safarilands on two visits.

Grey-backed Fiscal *Lanius excubitorius*—common in grassland adjacent to swamp but often hunting or sitting in trees at swamp edge and on bank.

Note: 'Swamp' warblers and other commonly caught species excluded from this list.

Appendix 2

Moult in a sample of African Sand Martins *Riparia paludicola* caught going into roost in papyrus swamp at Lake Naivasha in early 1990. For each period, the proportion of birds caught is given for various stages of primary moult (actual numbers are shown in parentheses).

Primary moult score	13–14 Jan	2–4 Feb	16–18 Feb	2–5 Mar
all old	13.2 (7)	0	0	0
1–10	3.8 (2)	2.5 (2)	7.3 (6)	1.8 (1)
11–20	3.8 (2)	6.4 (5)	6.1 (5)	7.3 (4)
21–30	22.6 (12)	24.3 (19)	17.1 (14)	14.5 (8)
31–40	32.1 (17)	17.9 (14)	13.4 (11)	14.5 (8)
41–50	24.5 (13)	48.8 (38)	56.1 (46)	61.8 (34)
[50	13.2 (7)	28 (22)	34.1 (28)	36.3 (20)]
Sample size	53	78	82	55